

What is claimed is:

**Claim 1.** A low attenuation optical fiber comprising:

    a dispersion (D) of 2.0 to 14.0 ps/nm/km in absolute value over a wavelength band of 1530 to 1565nm,  
    a transmission loss which remains no more than 0.25dB/km at a wavelength of 1520nm under the standard atmospheric conditions,  
    wherein said transmission loss at 1520nm does not exceed 0.25dB/km after being exposed, for a sufficient period, to an atmosphere consisting substantially of hydrogen under ordinary atmospheric pressure at ordinary temperature,

**Claim 2.** The low attenuation optical fiber according to Claim 1, further comprising:

    a dispersion slope (S) of no more than 0.15 ps/nm/km over a wavelength band of 1530 to 1565nm,  
    a polarization mode dispersion (PMD) of no more than 0.5 ps/ $\sqrt{\text{km}}$ ; and,  
    a loss increase of no more than 40dB/m at a wavelength of 1550nm as coiled in a diameter of 20mm,

**Claim 3.** The low attenuation optical fiber according to Claim 1, further comprising:

    an effective area ( $A_{\text{eff}}$ ) of no more than  $90 \mu \text{m}^2$  at a wavelength of 1550nm,

**Claim 4.** The low attenuation optical fiber according to Claim 1, further comprising:

    a dispersion slope of 0.04 ps/nm/km to 0.08 ps/nm/km over a wavelength band of 1530 to 1565nm,  
    a dispersion of 6ps/nm/km 10ps/nm/km in absolute value, and  
    an effective area of  $40 \mu \text{m}^2$  to  $70 \mu \text{m}^2$  at a wavelength of 1550nm,

**Claim 5.** The low attenuation optical fiber according to Claim 1, further comprising:

    an effective area of no more than  $90 \mu \text{m}^2$  at a wavelength of 1550nm,

**Claim 6.** The low attenuation optical fiber according to Claim 2, further comprising

    a dispersion slope of 0.04 ps/nm/km to 0.08 ps/nm/km over a wavelength band of 1530 to 1565nm,  
    a dispersion of 6ps/nm/km 10ps/nm/km in absolute value, and  
    an effective area of  $40 \mu \text{m}^2$  to  $70 \mu \text{m}^2$  at a wavelength of 1550nm,

Claim 7. A low attenuation optical fiber comprising  
a dispersion (D) of 2.0 to 14.0 ps/nm/km in absolute value over a wavelength  
band of 1530 to 1565nm,  
a transmission loss which remains no more than 0.25dB/km at a wavelength of  
1520nm under the standard atmospheric conditions,  
wherein said transmission loss at 1550nm does not exceed 0.25dB/km after  
being exposed, for a sufficient period, to an atmosphere consisting  
substantially of hydrogen under ordinary atmospheric pressure at ordinary  
temperature,

Claim 8. The low attenuation optical fiber according to Claim 7, further comprising:  
a dispersion slope (S) of no more than 0.15 ps/nm<sup>2</sup>/km over a wavelength band  
of 1530 to 1565nm,  
a polarization mode dispersion (PMD) of no more than 0.5 ps/√km; and,  
a loss increase of no more than 40dB/m at a wavelength of 1550nm as coiled in  
a diameter of 20mm,

Claim 9. The low attenuation optical fiber according to Claim 7, further comprising:  
an effective area (A<sub>eff</sub>) of no more than 90 μ m<sup>2</sup> at a wavelength of 1550nm,

Claim 10. The low attenuation optical fiber according to Claim 7, further comprising:  
a dispersion slope of 0.04 ps/nm/km to 0.08 ps/nm/km over a wavelength band  
of 1530 to 1565nm,  
a dispersion of 6ps/nm/km 10ps/nm/km in absolute value, and  
an effective area of 40 μ m<sup>2</sup> to 70 μ m<sup>2</sup> at a wavelength of 1550nm,

Claim 11. The low attenuation optical fiber according to Claim 8, further comprising:  
an effective area of no more than 90 μ m<sup>2</sup> at a wavelength of 1550nm,

Claim 12. The low attenuation optical fiber according to Claim 8, further comprising  
a dispersion slope of 0.04 ps/nm/km to 0.08 ps/nm/km over a wavelength band  
of 1530 to 1565nm,  
a dispersion of 6ps/nm/km 10ps/nm/km in absolute value, and  
an effective area of 40 μ m<sup>2</sup> to 70 μ m<sup>2</sup> at a wavelength of 1550nm,

Claim 13. A method of hydrogen-proof treatment for low-attenuation optical fibers, wherein said hydrogen-proof treatment is exposure to an atmosphere consisting substantially of deuterium at ordinary temperature and takes place after a fiber drawing process.